

What is claimed is:

1. A thermal spray grit roller comprises:
a roller shaft having an outer periphery;
a roller body connected to the outer periphery of the roller shaft, the roller body having a circumferential outer surface; and
a grit layer comprising a plurality of individual grit particles deposited on the roller body outer surface by a thermal spray process.
2. The thermal spray grit roller of claim 1 wherein the roller shaft has a columnar-shape and the roller body is integrally formed with the roller shaft.
3. The thermal spray grit roller of claim 1 wherein the roller shaft has a columnar-shape and the roller body is fixedly mounted to the roller shaft outer periphery.
4. The thermal spray grit roller of claim 1 wherein the roller shaft has a cylindrical-shape and the roller body is connected to the roller shaft by a plurality of spokes.
5. The thermal spray grit roller of claim 4 wherein the spokes fixedly mount the roller body to the roller shaft.
6. The thermal spray grit roller of claim 4 wherein the roller shaft, the spokes and the roller body are formed integrally.
7. The thermal spray grit roller of claim 1 wherein the grit particles are each composed of an electrically conductive material or a ceramic material.

8. The thermal spray grit roller of claim 7 wherein the electrically conductive material is selected from aluminum, aluminum alloy, zinc, zinc alloy, copper, brass, nickel, titanium, carbon steel, stainless steel, chrome, iron, cobalt, molybdenum, chromium carbide, and tungsten carbide.
9. The thermal spray grit roller of claim 7 wherein the ceramic material is selected from aluminum oxide, chromium oxide, and zirconium oxide.
10. A method for manufacturing a thermal spray grit roller comprising the steps of:
- collecting raw materials for use in the method, including at least one roller subassembly, comprising a roller body connected to a roller shaft, and application material;
 - degreasing the outer surface of each roller body;
 - masking any portion of the roller body outer surface that will not be covered by a grit layer; and
 - forming a grit layer on the roller body outer surface with a thermal spray process.
11. The method of claim 10 wherein the step of degreasing comprises immersing the roller subassemblies in a tank containing trichloromethane for 20 to 30 seconds and
- air drying the roller subassemblies for substantially 60 seconds.
12. The method of claim 10 further comprising the step of inspecting a representative sample of the rollers after forming the grit layer.
13. The method of claim 10 further comprising the step of inspecting the raw materials including
- ensuring that the application material is the correct material;

ensuring that the dimensions of the roller shaft and roller body conform to specification; and

ensuring that the roller shaft and roller body conform to cosmetic requirements.

14. The method of claim 10 wherein the step of masking comprises masking the portions of the roller body outer surface with a polyurethane protector.

15. The method of claim 10 further comprising the step of sandblasting the outer surface of roller bodies composed of metal, after the step of masking, to remove any oxidation.

16. The method of claim 15 wherein the step of sandblasting includes:
setting a sandblasting gun to 3 to 4.5 psi; and
blasting the roller body surface for 25 to 50 seconds with sand having a particle size of #80 to #200.

17. The method of claim 15 wherein the step of sandblasting includes sandblasting the roller body surface to produce a roughness average of 0.2 to 1.0 Ra.

18. The method of claim 15 further comprising the step cleaning the roller body surface after the step of sandblasting.

19. The method of claim 18 wherein the step of cleaning includes sweeping the roller body surface with an air brush.

20. The method of claim 10 wherein the step of forming a grit layer includes:

installing electrodes or verifying that electrodes of the application material are installed in an arc spray machine;
setting the arc spray machine output power;
setting the arc spray machine compressed air pressure;
setting or verifying the gap between the spray gun and the roller body surface;
setting the spray gun feed rate;
setting the rotational speed of the roller; and
energizing the arc spray machine for a predetermined period of time, whereby the arc spray machine deposits a grit layer having the specified surface roughness and the specified thickness.

21. The method of claim 20 wherein the spray gun feed rate is set at 0.2 to 0.5 m/min.

22. The method of claim 20 wherein the rotational speed of the roller is set at 200 to 400 rpm.

23. The method of claim 20 wherein the gap between the spray gun and the roller body surface is set in the range of 150 to 250 mm.

24. The method of claim 20 wherein the arc spray machine power is set in the range of 25 to 35 volts and 50 to 300 amps and the compressed air pressure is set in the range of 4 to 7 psi.

25. The method of claim 10 wherein the step of forming a grit layer includes:

installing or verifying the installation of the application material and a bonding agent in a plasma spray machine;
setting the plasma spray machine output power;

setting the plasma spray machine gas pressure;
setting or verifying the gap between the spray gun and the roller body surface;
setting the spray gun feed rate;
setting the rotational speed of the roller; and
energizing the plasma spray machine for a predetermined period of time, whereby the plasma spray machine deposits a grit layer having the specified surface roughness and the specified thickness.

26. The method of claim 25 further comprising the step of applying an initial grit layer of the application material to the roller body surface with an arc spray machine.

27. The method of claim 25 wherein the spray gun feed rate is set at 0.2 to 0.5 m/min.

28. The method of claim 25 wherein the rotational speed of the roller is set at 200 to 400 rpm.

29. The method of claim 25 wherein the gap between the spray gun and the roller body surface is set in the range of 70 to 120 mm.

30. The method of claim 25 wherein the plasma spray machine power is set in the range of 40 to 80 volts and 500 to 650 amps, the arc gas pressure is set in the range of 60 to 180 psi, and the carrier gas pressure is set in the range of 30 to 80 psi.